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# DEVELOPMENT OF A DEDICATED LPG ULTRA LOW EMISSION VEHICLE

**Subcontract No. ZAW-4-12244-01**

## ABSTRACT


The project to develop a dedicated LPG vehicle that will meet California ultra-low emission vehicle (ULEV) standards using LPG gaseous fuel injection and air mass flow sensor technologies is essentially completed. After developing the system components, such as vapor injectors, regulator, fuel rail, integrated air mass flow sensor and a purpose designed 32 bit ECU, the system was extensively dynamometer tested for static and transient calibration on a Chrysler 3.3 liter V6 power plant.

The propane engine management system was then transferred to a Dodge Intrepid which had been baselined on gasoline, then converted to propane, and a special emission after treatment was installed. This consisted of tubular short exhaust headers with shields, and close coupled three way catalysts that were specially formulated for propane. No EHCs or air injection systems were used.

There then followed a period of emission calibration development for ignition mapping and closed loop air fuel ratio biasing adjustment. The cold start development was very straight forward, as no cold enrichment is required and only a little spark retard is needed for quick catalyst light off.

After a series of development FTPs, the vehicle reached ULEV standards with engineering margins. Advantage was taken of propane's lower hydrocarbon reactivity and the methane content of the exhaust emissions was also deducted.

The vehicle is currently undergoing further emission testing after a scheduled durability test, which was carried out without any needed servicing of the prototype propane engine management system.

Further work is being planned on cold ambient cold start testing, VCI catalyst coating, and fuel economy improvement at higher engine compression levels.



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